Rodent Research and Education, 2018

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Abstract
Rodent pests affect people in a variety of ways, from causing structural damage and contaminating food, to spreading disease. To reduce human-rodent interactions requires knowledge of rodent behavior and biology. The NYS IPM Program collaborates with researchers, public health officials, pest management professionals, manufacturers, and the public to generate and disseminate information that is intended to increase adoption and implementation of integrated rodent management. In 2018, work continued on a research project designed to understand and improve rodent management practices at food distribution centers. A partner (Hank Hirsch, RK Environmental Services, LLC) was identified that granted access to sites in the New York Metropolitan area. Working with Regional Operations Managers from RK Environmental, data on device placement and rodent activity was collected at seven sites. The IPM Program also reached over 1900 individuals in face-to-face and virtual presentations on rodent management, prepared an article for a pest management trade magazine, and developed new resources to help homeowners utilize snap traps.

Background and Justification
Commensal rodents are a pest species that affect New Yorkers in urban, suburban and rural areas. Their ability to gnaw on objects to gain access to an area or obtain perceived resources can cause physical damage to buildings, not just by chewing through doors and walls, but potentially causing fires when wires are exposed. Through consumption and defecation, rodents contaminate food and are important reservoirs of human disease. Long-term exposure to rodent hair, droppings and urine can result in both asthma and allergies, especially for children living in urban environments where abundant food, water and shelter support large rodent populations. Exposure to rodents also poses a risk of zoonotic disease transmission for a range of bacterial, parasitic, protozoan, and viral pathogens. These can be transmitted directly through bites or indirectly by exposure to urine, feces or ectoparasites.

Despite their pest status, rodent management remains a challenge. This is due in part to the complex biology and behavior of rodents, and a lack of understanding of best management techniques to address populations – not just individuals. In addition, human behaviors often contribute to rodent populations, with poor sanitation and a lack of exclusion providing

access to resources that rodents need to survive (food, water and shelter). As a result, human-rodent interactions continue, with some having dire consequences for human health.

To improve rodent management practices and reduce risks associated with these pests, research to better understand population dynamics and current management practices is needed. This information must then be disseminated in a meaningful way to individuals and organizations that implement rodent management.

Objectives

1. Evaluate the effectiveness of rodent management practices at food distribution centers.
2. Develop and deliver educational resources and presentations that will lead to increased adoption of IPM practices.

Activities

Evaluate the effectiveness of rodent management practices at food distribution centers.

The goal of this Hatch-funded project is to evaluate rodent management practices at food distribution centers (DCs). Currently, most pest management companies that service DCs install rodent management equipment according to guidelines set forth by third party auditors. For example, mousetraps are installed on either side of every door and at 25-foot intervals along the interior walls of the building, while rat bait stations are installed every 50 to 100 feet on the exterior perimeter of the facility. The theory behind these placements is that they provide a barrier against rodents, intercepting them before they cause damage on the interior of the facility. However, these guidelines are not based on an understanding of rodent biology and may contribute to the use of excess traps and pesticide bait that are not likely to intercept rodents. Furthermore, each device must be checked by a pest professional, which can unnecessarily increase service time.

The initial design of this project called for a comparison of rodent management devices deployed at intervals along the interior and exterior of a facility to additional devices that would be added by researchers based on our assessment of conditions that favor rodent activity. Due to the limitations of finding suitable sites, however, a new design was proposed in 2018 that categorized devices already in place based on where they are located (for example: near a door, interval placement along a wall, near dumpster, etc.) as well as the proximity of conditions that favor rodents. Our analysis will investigate current and historical trap catch data for those placements to identify relationships between the type of placement and rodent activity. Based on this design that does not require addition of new equipment, we were able to include more sites that represent the diversity of food distribution facilities.

Develop and deliver educational resources and presentations that will lead to increased adoption of IPM practices.

This is the continued outreach portion of the New York State IPM Programs efforts to educate audiences about safe and effective pest management strategies.

Results and discussion:

Evaluate the effectiveness of rodent management practices at food distribution centers.

In 2018, we continued to reach pest management and food safety professionals with articles previously published in trade magazines (see 2017 Rodent Report), through formal presentations and personal interactions. In 2018, principal investigators provided a total of 15 presentations on rodent management and pest exclusion to audiences across the country (presentations took place in seven NY counties; Lexington, KY; Lincoln, NE; Atlantic City, NJ; Portland, OR; and two national webinars; Table 1). During presentations, the project was discussed in terms of goals, progress and current insights. The project was also mentioned by collaborators at national meetings and in relation to a similar research project on remote monitoring technology for rodents. As a result of these efforts, additional research sites are now available for study in 2019.

To date, information was collected from rodent management devices at seven food distribution centers in the NY metropolitan area. Site access was granted by a partnering pest management company, RK Environmental Services. This partnership is critical to the research, and has provided some standardization in terms of the pest management program in place at sites and the format of data obtained. At each of the seven sites, devices were described using a coded list of 63 and 24 characteristics, or "placement profiles," for interior and exterior equipment, respectively. Characteristics included features that could affect the attractiveness of the device for rodents, such as sources of food, water, shelter, heat and access to the facility. In addition to recording characteristics observed at the device itself, the distance to nearby characteristics was also measured.

For each site, data was obtained from RK Environmental Services on the rodent activity at each device. This data includes the date and time devices were checked, and the number and type of pests captured. Following acquisition of this data, a representative from the Statistical Consulting Unit at Cornell University was contacted to consider analysis options, refine data acquisition techniques, and to determine how best to input data. Based on this consultation, data can be analyzed to determine what placement profiles are most important for rodent management, and to investigate possible changes in activity based on the time of year/season, which can lead to enhanced rodent management.

Finally, as a result of a national webinar presentation, the IPM Program was contacted by a Quality Assurance Auditor from Abell Pest Control in Canada. Abell has offered access to food distribution centers for our study, which provides an opportunity to investigate pest management practices in distribution centers that ship to the US, are in a colder climate and have more restrictions on pesticide use. Researchers have been contacted by two other corporations, including a national pest management firm and national food distributor, both willing to partner on this project. Based on these contacts, there is good potential access to field sites for future investigations that might include pilot studies implementing the findings of this work.

The next steps in this project include obtaining and analyzing data with assistance from the Statistical Consulting Unit at Cornell University. We will then summarize our findings in an industry publication, technical document, peer-reviewed manuscript, PowerPoint presentation for the industry, and for a final report. We hope that through connections with collaborators, we will have an opportunity to meet with agencies that influence guidelines for rodent management at food

distribution centers, including third party auditing agencies, but also trade groups such as the National Pest Management Association.

Develop and deliver educational resources and presentations that will lead to increased adoption of IPM practices.
In 2018, a total of 17 presentations and workshops were offered to audiences across the country, providing 1966 contact hours of information on rodent management (Table 1). Topics requested by meeting organizers included general rodent talks that covered biology and management (6), discussions on the health implications of rodents (2), and how to properly exclude rodent pests (7; a separate 2018 report covers pest exclusion in detail). Rodents were covered as a topic in two other presentations that focused on general IPM.

Table 1. List of presentations that provided information about rodent management.

Date	Location	Conference/ Meeting Name	Presentation Title	Contact Hours
1/30/2018	Lynbrook/ Nassau	Arrow Annual Training Meeting	Urban Rats and Mice: Health Concerns	68
2/13/2018	Lincoln, NE	Nebraska Urban Pest Management Conference	Rodentology and Pest Management	101
2/23/2018	Elmsford/ Westchester	Target Specialty Products Seminar	Adding Exclusion Services to Your Company Profile	65
3/4/2018	Atlantic City, NJ	New Jersey Environmental Health Association Annual Education Conference	Rodentology and Pest Management	101
3/22/2018	Baltimore, MD	9th International IPM Symposium	"Pest Exclusion: The Future of Pest Management	8
4/10/2018	Rochester/ Suffolk	2018 Suffolk County Vector Recertification Course	Rodentology and Pest Management	48
9/10/2018	Webinar	NPMA Technical Webinar	Understanding the Disease Potential of Urban Rodents	37
9/12/2018	Webinar	StopPests Webinars	Developing an Exclusion Program for Cockroaches and Rodents	142
11/7/2018	Lexington, KY	Kentucky Short Course	Pest Entry and Exclusion	174
11/7/2018	Lexington, KY	Kentucky Short Course	Rodents in the City	517
11/13/2018	Portland, OR	Target Specialty Products Portland Workshop	Rodents 101	177

11/26/2018	Ithaca/ Tompkins	Applied Entomology Class	Urban Pest Management	13
11/28/2018	Albany/Albany	IPM: Identification and Exclusion Best Practices Workshop	Pest Entry and Exclusion	176
11/30/2018	Queens/New York	Magic Exterminating Training Day	IPM for Schools	17
11/30/2018	Queens/New York	Magic Exterminating Training Day	Rodentology and Pest Management	26
12/12/2018	East Greenbush/ Rensselaer	IPM: Identification and Exclusion Best Practices Workshop	Pest Entry and Exclusion	148
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IPM staff participated in a series of conference calls hosted by NPMA QualityPro to design rodent management guidelines for the new Public Health: Rodent certification [www.npmaqualitypro.org/public-health/#]. This certification will be available in 2019.

IPM staff provided interviews for print and visual media about rodents and their management. As of January 2019, the following materials have been published:

- Interview by Sarah Witman, Wirecutter [a New York Times company; 7/25/2018]: https://thewirecutter.com/reviews/best-mousetrap/
- Interview by Ana Chacin [journalism student from American University; 11/10/2018]: http://thewash.org/2018/11/13/eliminating-food-sources-is-the-solution-to-rat-problems-pest-expert-says/

Additionally, IPM staff contributed a trade magazine article, and an early technical document was repurposed by the StopPests in Housing Program.

- Frye, Matt. "Research Round-up." Pest Control Technology Magazine, GIE Media, Inc. 28 August 2018. Web. URL: www.pctonline.com/article/research-round-up/
- Tracking Powders in Rodent Management: A Cautionary Tale was reprinted by the StopPests in Housing Program on their blog.

Finally, two videos were created to help people learn how to set snap traps and use them effectively.

- "How to Set a Snap Trap" https://youtu.be/EJswB6Pw9ZQ
  - YouTube Views: 29; Facebook Statistics: 866 views; 7 shares; 720 reached; 84 engagements
- "Tips for using Snap Traps" https://youtu.be/gWHem8pTcMk; YouTube Views: 19